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(54) Title: UDP-GALACTOSE: β-*N*-ACETYL-GLUCOSAMINE β1,3GALACTOSYLTRANSFERASES, β3GAL-T5

(57) Abstract

A novel gene defining a novel enzyme in the UDP-D-galactose: β-*N*-acetylglucosamine/β-N-acetylgalactosamine β1,3galactosyltransferase family, termed β3Gal-T5, with unique enzymatic properties is disclosed. The enzymatic activity of β3Gal-T5 is shown to be distinct from that of previously identified enzymes of this gene family. The invention discloses isolated DNA molecules and DNA constructs encoding β3Gal-T5 and derivatives thereof by way of amino acid deletion, substitution or insertion exhibiting β3Gal-T5 activity, as well as cloning and expression vectors including such DNA, cells tranfected with the vectors, and recombinant methods for providing β3Gal-T5. The enzyme β3Gal-T5 and β3Gal-T5-active derivatives thereof are disclosed, in particular soluble derivatives comprising the catalytically active domain of β3Gal-T5. Further, the invention discloses methods of obtaining β1,3galactosyl glycosylated saccharides, glycopeptides or glycoproteins by use of an enzymically active β3Gal-T5 protein or fusion protein thereof or by using cells stably transfected with a vector including DNA encoding an enzymatically active β3Gal-T5 protein as an expression system for recombinant production of such glycopeptides or glycoproteins. Also a method for the identification of DNA sequence variations in the β3Gal-T5 gene by isolating DNA from a patient, amplifying β3Gal-T5-coding exons by PCR, and detecting the presence of DNA sequence variation, are disclosed.